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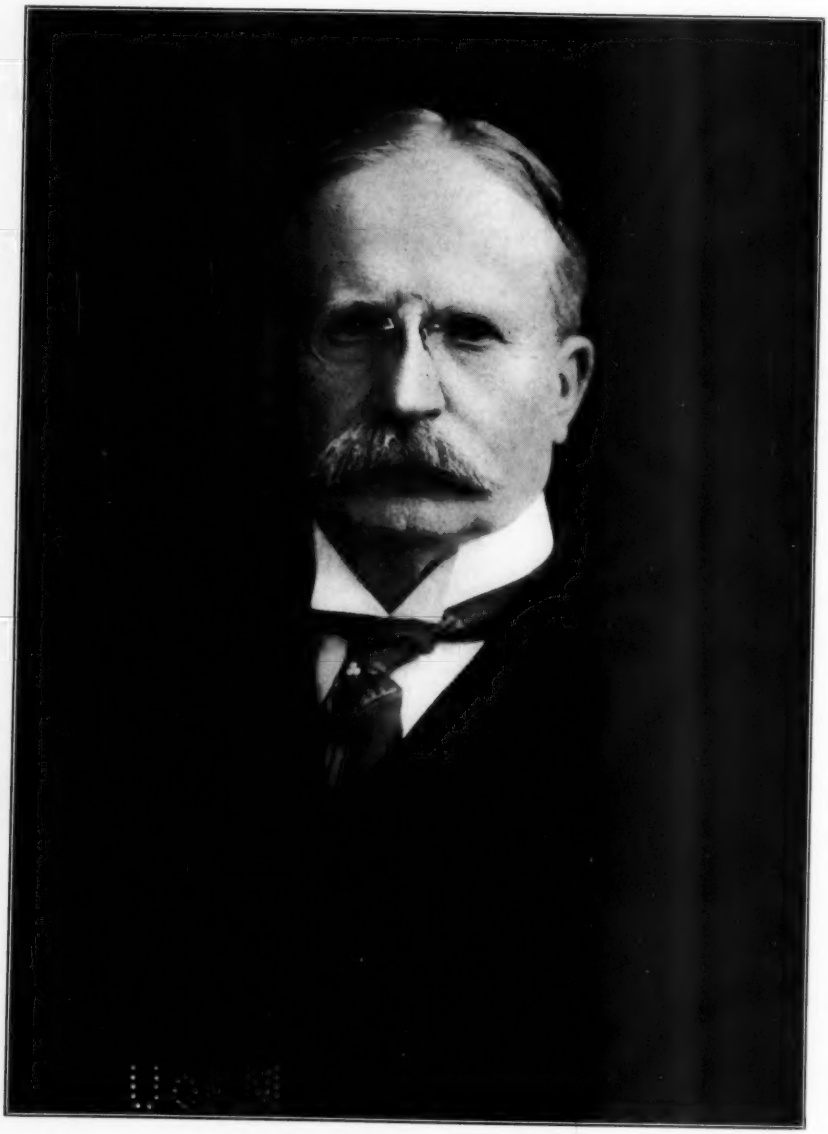

DR. WALTER WYMAN, 1848–1911.

THE AMERICAN
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JANUARY, 1912

WALTER WYMAN.

Dr. Walter Wyman, Surgeon-General of the United States Public Health and Marine-Hospital Service, a member of numerous scientific and professional organizations and an Honorary Member of the Philadelphia College of Pharmacy, died in the City of Washington, November 21st, 1911. He was born in St. Louis, Mo., Aug. 17, 1848, his father, Edward Wyman, LL.D., being a widely known educator of that city.

Walter Wyman received his academic education at the University of St. Louis and later attended Amherst (Mass.) College, from which he received the degree A.B. in 1870, A.M. in 1889 and LL.D. in 1911. His medical course was taken in St. Louis, where he graduated in 1873 from the Medical Department of Washington University, then popularly known as the St. Louis Medical College. Dr. Wyman entered the Marine-Hospital Service as Assistant Surgeon Oct. 21, 1876, was promoted to Surgeon Oct. 1, 1877, and was made supervising Surgeon-General May 27, 1891. Practically all of the working years of his life were devoted to the development of the public health service and to bringing about a proper recognition of the value of sanitation and preventive medicine.

During the 20 years of his administration as the executive head of the Bureau the service was expanded, from its somewhat restricted field of caring for sick and disabled seamen and a general supervision of medical matters in connection with the merchant marine, to the representative public health service of the United States with a wide range of work already established and the possibility of additional achievements limited only by inadequate appropriations and the hampering influences of men who should be, and in many instances claimed to be, favorable to the development of public health work.

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While the evolution of the Public Health Service, in this country, has at times been characterized as being extremely slow, an unbiased retrospect of the development of the Public Health and Marine-Hospital Service during the administration of Surgeon-General Wyman will convince the most skeptical that as far as he was concerned there can be no question but that his contribution to the safeguarding of the public health has been of a constructive and permanent character. While naturally conservative he was consistent in being sure of the ground which he traversed and it has truly been said of him that the enforcement of the laws and the regulations entrusted to his Bureau has been uniformly firm, impartial and thorough. Furthermore, the legislation which he advocated and secured was practical and complete and has withstood the test of time.

The Act of 1902 under the provisions of which the U. S. Public Health and Marine-Hospital Service is at present organized not only changed the name of the Service but also served to broaden the scope and increase the efficiency of its work by making statutory provisions for a number of the activities which previous to the enactment of this law, had only the authority of regulation.

In addition to the Marine-Hospital Service and the supervision of the Quarantine Service throughout the United States and its dependencies, this Service now provides for the systematic study of endemic and epidemic diseases and the development of methods for controlling the same, and its organization is based on such fundamentally broad lines that it can, and no doubt will be developed into a public health service second to that of no other nation.

Even as at present organized, and hampered as it is by a lack of due appreciation on the part of the people who should be deeply interested, this Service has been able to accomplish much toward securing to the citizens of this country additional safeguards against infectious diseases and greater uniformity in the potency and efficiency of some of the more important remedies used by physicians.

Not the least valuable of the practical accomplishments of this Service during the administration of Surgeon-General Wyman is the recognition that has been accorded to pharmacy as a factor in the public health work. This is evidenced more particularly by the standardization of serums and vaccines, and the study of other medicaments used in the treatment of diseases, that have been carried on in the Hygienic Laboratory of the U. S. Public Health and Marine-Hospital Service.

This laboratory was the creation of Surgeon-General Wyman, who devoted considerable time and thought to its development along highly scientific though strictly conservative lines. The several divisions of the laboratory are primarily devoted to the study of diseases and the remedies designed for their modification or cure, and even in the short time that it has been in existence it has amply demonstrated the possibilities of conscientious research work and the importance of systematically controlling the more potent agents used in the prevention and cure of diseases.

It was in this laboratory that pharmacy, advanced, scientific and utilitarian pharmacy, first received proper recognition in Government Service, and as noted above, much of the work that has been done in the several divisions of the Hygienic Laboratory is more or less directly interesting to the really up-to-date pharmacist. The truth of this assertion is amply evidenced by the 78 Bulletins that have been issued up to the present time more than half of which deal with subjects of direct interest to pharmacy.

Surgeon-General Wyman was an efficient administrator, alert, progressive and so thoroughly devoted to his duty that despite his naturally retiring personality he was able to enthuse all who came in contact with him and the resulting zeal of the medical officers of the service has contributed no little to the effectiveness of the work done under the auspices of the Bureau.

As an illustration of the varied character of activities of the Public Health and Marine-Hospital Service it is but necessary to point out that it has been instrumental, during the administration of Surgeon-General Wyman, in restricting yellow fever in the Southern States, stamping out bubonic plague in California, preventing an outbreak of pestilence in San Francisco, investigating hook worm disease and pellagra in the Southern States, making a systematic study of leprosy, a comprehensive study of typhoid fever, a study of the general problem of rabies and in resisting threatened cholera epidemics in addition to the almost innumerable routine and special activities of different branches of the service.

The life of Dr. Wyman was indeed heroic for, while he possessed ample opportunity for basking in the blaze of publicity and despite repeated recognition of his ability as an expert in sanitation, he chose to direct the multitudinous affairs of the Bureau over which he presided in such a way that his name but seldom appeared prominently in connection with the work done by his subordinates. Those who knew him best admired his genius for organization and

his ability to cope with momentous questions relating to public health and sanitation.

His death is a loss not only to his friends and to the members of the medical and pharmaceutical professions, but also to the Nation. M. I. W.

THE DETECTION OF GUM AMMONIACUM AND GUM GALBANUM IN ASAFETIDA.

By H. M. Sechler and M. Becker,
Analytical Department, Smith, Kline & French Co.

Owing to the very high price of Asafetida and consequently the temptation to adulterate it with gums of lower price, it seems that more specific tests should be inserted in the next pharmacopœia for the detection of other gums, particularly Gum Ammoniacum and Gum Galbanum. Professor Charles H. LaWall first called to our attention that Gum Ammoniacum and Gum Galbanum were possibly being used to adulterate Asafetida.

Color Reactions to Detect the Presence of Gum Ammoniacum and Gum Galbanum in Mixture with Asafetida.—For the purposes of applying the various color tests ten per cent. emulsions were prepared from Asafetida, Ammoniacum and Galbanum, also a ten per cent. emulsion made with an admixture of Asafetida containing twenty per cent. of Ammoniacum, that is from 4 Gms. Asafetida, 1 Gm. Ammoniacum and sufficient water to make the emulsion measure 50 c.c.; also a ten per cent. emulsion made with an admixture of Asafetida containing twenty per cent. of Galbanum, that is from 4 Gms. Asafetida, 1 Gm. Galbanum and sufficient water to make the emulsion measure 50 c.c.

Hypobromite Test.—P. C. Plugge (U. S. D., 17th ed., page 149) states that sodium hypobromite is a sensitive reagent for the detection of Ammoniacum.

The following reagent was used for this test: 40 Gms. sodium hydroxide, 10 c.c. bromine and sufficient water to make 200 c.c.

In applying this test to each of the emulsions mentioned above, about 2 c.c. of the emulsion with 5 c.c. of water were placed in a test tube, the test tube inclined and the reagent allowed to run slowly to the bottom.

With the emulsion of Asafetida, emulsion of Galbanum and emulsion made with mixture of these gums an olive green color

was produced. With the emulsion of Ammoniacum a cherry red was produced, with the emulsion of Asafetida with Ammoniacum a distinct transient red was seen when the reagent was added.

Sulphuric Acid Test.—Two cubic centimeters of the Asafetida emulsion was placed in a test tube and thirty drops of cold concentrated sulphuric acid were added. No perceptible change of color took place.

When 2 c.c. of the Ammoniacum emulsion was treated in the same way no perceptible change took place.

When 2 c.c. of the Galbanum emulsion was treated in the same way a reddish violet color was produced.

The following color reactions have been submitted to us as a standard for Asafetida:

Phloroglucin and Hydrochloric Acid; Sulphuric Acid and Ammonia Water.—It was stated that on treating Asafetida with phloroglucin and hydrochloric acid a cherry red was produced. This reaction is also given by the other gums of this class.

It was also stated that Asafetida treated with Sulphuric Acid and neutralized with an alkali, preferably ammonia, a beautiful blue fluorescence would be produced. This fluorescence is due to umbelliferone, a principle characteristic of the gums and resins obtained from the Umbelliferæ with the exception of Ammoniacum, which evidently does not contain this principle. Consequently, neither of these reactions can be relied upon in the detection or identification of these gums.

Thinking that possibly the difference in the appearance, odor or refractive indices of the oils obtained from Asafetida, Ammoniacum and Galbanum might be useful in detecting these gums used as adulterants of Asafetida, we made a steam distillation of each of the following:

1. Gum Asafetida.
2. Gum Ammoniacum.
3. Gum Galbanum.
4. Asafetida with 20 per cent. Ammoniacum.
5. Asafetida with 20 per cent. Galbanum.

Some difficulty was encountered in obtaining the oil from Gum Ammoniacum, as it is only present to the extent of about 0.2 per cent., and boils between 250° and 290° C. This difficulty was, however, overcome by continued distillation, and the application of heat to the flask containing the gum. While this method of heat-

ing the flask containing the gum was used in the other cases, this additional heat was probably not necessary when Gum Ammoniacum was not present. Asafetida contains about 4 per cent. of oil and Galbanum about 20 per cent. of oil.

Difference in Appearance of Oils.—The oil from Gum Asafetida is colorless. The oil from Gum Ammoniacum is dark yellow, and has a greater viscosity than any of the others. The oil from Galbanum is light yellow in color. The color of the oils from the admixtures were modified proportionately according to the gums used in the distillation. As noted above, the oil from Asafetida is colorless, and any difference in color noted in distillation of sample of Asafetida should be regarded with suspicion.

In distilling mixtures we noted that Oil of Galbanum came over at about the same temperature as that of Asafetida, but in the case of mixtures containing Gum Ammoniacum the distillation should be carried farther on account of the high boiling point and small amount present. We believe that mixtures of the gums may be detected by the appearance of the oil obtained by steam distillation.

Odor of the Oils.—The oils distilled from these gums have similar odors to the gums from which they were obtained, but it is doubtful if adulteration could be detected with certainty by the difference in odor.

Refractive Indices of Oils Distilled from Samples.—

1. Oil from Asafetida N/D at 25° C. 1.4974
2. Oil from Ammoniac N/D at 25° C. 1.4765
3. Oil from Galbanum N/D at 25° C. 1.4840
4. Oil from mixture of Asafetida and Ammoniacum N/D at 25° C. .. 1.4959
5. Oil from mixture of Asafetida and Galbanum N/D at 25° C. 1.4929

We would suggest that an oil having a refractive index of less than 1.4960 be considered with suspicion.

It is interesting to note that the refractive index and the specific gravity of Oil of Asafetida are considerably higher than the oils from the other two gums following the well established principle that the higher the specific gravity of an oil the higher will be the refractive index.

We believe the reading of the oils obtanied from the gums to be the more accurate as by distilling the oils some definite principle is isolated which is not influenced by others of which the gums

are composed. This method would require elaborate apparatus to carry out, therefore, is not as practicable as the simple color tests suggested, which we believe will indicate the presence of at least 10 per cent. of these adulterants when mixed with Asafetida.

AROMATIC SPIRIT OF AMMONIA.

A METHOD OF ANALYSIS, AND A SUGGESTION FOR A CHANGE IN THE FORMULA.[1]

By Linwood A. Brown, Kentucky Agricultural Experiment Station.

Some months ago the author's attention was called to the unstable nature and the unsatisfactory formula for the official Aromatic Spirit of Ammonia, by having to examine a number of samples collected by the drug inspector for the Kentucky Agricultural Experiment Station.

We have been keeping close watch on those drug preparations liable to undergo change on keeping, not with the intention of catching the druggist in selling a drug below standard, but in order that we might study the effect of storage on preparations of an unstable nature, and hope to be able to be of benefit to the druggists of Kentucky in suggesting to them better methods of keeping their stock of perishable drugs.

So far as the author is aware, there is no published method for the satisfactory examination of Aromatic Spirit of Ammonia, nor does the author claim any originality for the method given in this paper, it being only an adaptation of old methods to meet the needs for this particular preparation.

In the U. S. Pharmacopœia preparation the official ammonium carbonate, which is a mixture of the bicarbonate and carbamate, is converted into the normal carbonate by the hydroxide, forming 40.6 gms. of the normal carbonate per liter, with 4.94 gms. NH_3 per liter as hydroxide in excess. Owing to the fact that the official carbonate rapidly undergoes change, when exposed to the air and more slowly when kept in covered containers, being converted into

[1] Read before the Division of Pharmaceutical Chemistry of the American Chemical Society, June, 1911.

the bicarbonate, the preparation made from ammonium carbonate, which has undergone this change, will be deficient in ammonium salts, and owing to the volatility of the ammonia from the hydroxide, considerable loss of ammonia gas is liable to occur unless great care is taken in filtering the finished preparation.

The method used in the examination of the Aromatic Spirit of Ammonia is as follows:

Twenty-five cubic centimetres of the sample at 15.6° C. are added to about fifty c.c. of distilled water free from CO_2, and contained in a 100 c.c. graduated flask, then filled to the mark with the CO_2 free water.

The determinations to be made are, total NH_3, CO_2, and alcohol.

Total NH_3 and Alcohol.

A 50 c.c. aliquot of the liquid is transferred, by means of a standard pipette, to a 300 c.c. Erlenmeyer flask containing 25 c.c. of normal sulphuric acid, a few pieces of filter paper added to prevent bumping, and the flask connected with a condenser by means of a Kjeldahl spray trap, to prevent any loss of sulphuric acid by being carried over mechanically.

Heat is applied and continued until nearly 50 c.c. of distillate have passed over, the distillate is cooled to 15.6° C., and then made up to the mark by the addition of water, and the alcohol determined by taking the specific gravity at 15.6° C. The small amount of oils (0.15 c.c.) present is not sufficient to interfere to any extent with the determination of the alcohol.

However, if desired, the distillate can be saturated with sodium chloride, and the oils removed by petroleum ether, and the aqueous liquid again distilled and the alcohol determined in the distillate.

Determination of Total NH_3.

The residue remaining in the flask, after washing out the spray trap, is diluted to about 150 c.c. with water, cochineal indicator added and the excess of acid determined by the titration with N/1 KOH.

The number of c.c. of N/1 H_2SO_4 consumed x .01693 x z x 4 = gms. NH_3 per 100 c.c. of original sample.

Determination of CO_2.

10 c.c. aliquots of the diluted sample are taken and transferred to 150 c.c. flasks containing 25 c.c. distilled water, free from CO_2, and 10 c.c. saturated barium hydroxide solution added. The flasks are then stoppered with rubber stoppers and allowed to stand for 24 hours at room temperature, or heated by immersing flask in boiling water for 2 or 3 hours, and then cooling.

From this point on, two methods may be used:

The $BaCO_3$ may be filtered off onto a weighed gooch crucible, washed with several portions of water, then with alcohol, dried and weighed.

The weight of $BaCO_3$ x .3989 equals NH_4HCO_3 $NH_4NH_2CO_2$: $BaCO_3$ x .4005 equals NH_4HCO_3.

The gravimetric method has been found to be the most satisfactory, by the writer, and the use of an alundum porous crucible was found to work splendidly in this case.

In case the volumetric method is preferred, filter off the ppt. onto an unweighed gooch, wash well, then place gooch containing ppt. in a 200 c.c. beaker, add 50 c.c. N/10 HCl, heat on water bath until $BaCO_3$ is dissolved, remove gooch, wash and remove asbestos from liquid by filtering through a plug of absorbent cotton in a funnel, wash thoroughly, add methyl-orange to cooled liquid and titrate excess of acid with N/10 KOH.

Each c.c. N/10 HCl consumed equals .0039 gm. $\begin{cases} NH_4HCO_3 \\ NH_4NH_2CO_2 \end{cases}$

Number of c.c. N/10 consumed x .0039 x 10 x 4 equals gms. U. S. P. Ammonium carbonate per 100 c.c. of original sample.

Calculation of Results:

Knowing the amount of total NH_3, and of the ammonium carbonate, in grams per 100 c.c., it is easy enough to calculate the amount of hydroxide present.

Multiply the amount in grams of ammonium carbonate U. S. P. found, by .3255, equals grams NH_3 existing as carbonate.

Total NH_3 minus NH_3 as carbonate, equals NH_3 in form of hydroxide.

The U. S. Pharmacopœia formula calls for 10 per cent. NH_3 by

weight, in aqua ammonia, and which has a specific gravity of .960, therefore, multiplying gms. NH_3 as hydroxide, by 10, and dividing by .96 will give cubic centimetres of 10 per cent. ammonium hydroxide per 100 c.c.

In case the CO_2 is determined by the gravimetric method, multiply the weight of $BaCO_3$ by .3989 x 10 x 4 equals grams ammonium carbonate per 100 c.c. of original solution.

This method was tried out in connection with some experiments the author has been carrying out in the study of the rate or deterioration of Aromatic Spirit of Ammonia, with the following results:

Samples, A, B, C, and D were made up, using ammonium carbonate, as free from bicarbonate formation as possible, adhering strictly to the U. S. Pharmacopœia formula for Aromatic Spirit of Ammonia, with the exception that the aqua ammonia used was found to contain 9.39 per cent. NH_3 gas by weight, instead of 10 per cent. as called for.

The preparation was made up at the time, not so much with the idea in view of producing a perfect preparation, but in order to determine the rate of deterioration when kept under certain conditions. For that reason the preparation will be found deficient in ammonium hydroxide, in addition to that caused by loss in filtration. No attempt was made to prevent loss of NH_3 by cooling the solutions; in fact, the U. S. Pharmacopœia does not give any directions to that effect, an oversight that should be corrected in the next U. S. Pharmacopœia.

One liter of the preparation was prepared and assayed, with the result shown in tables for experiments A, B, C, and D, under date of March 27, 1911.

This was divided into four portions of about 250 c.c. each, labelled respectively, A, B, C, and D.

A, was placed in a ground glass stoppered bottle and kept in a refrigerator at a temperature of 10 to 17° C.

B, was placed in the same kind of bottle and kept on a shelf in a laboratory, exposed to a temperature of about 20 to 25° C., except during the recent warm weather, when the temperature went as high as 35° C.; this sample was also exposed to a bright light.

C, was placed in an ordinary 8-ounce bottle and stoppered with a rubber stopper, and kept in a cooler portion of the laboratory, exposed to diffused light.

D, was placed in an 8-ounce bottle and closed with a plug of cotton to keep out dust. This experiment was made to get some idea of how rapidly this preparation would lose in strength if unprotected by a stopper, or by refrigeration.

EXPERIMENT "A."

Date of Assay	Total NH_3 In gms. per 100 c.c.	U. S. P. Ammonium Carbonate. In gms. per 100 c.c.	10 per cent. Ammonium Hydroxide c.c. per 100 c.c.	Alcohol per cent. Absolute Alcohol by Volume.
March 27, 1911....	1.8301	3.3696	7.64	64.50
April 27, 1911.....	1.843	3.354	7.83	66.32
May 27, 1911.....	1.8393	3.315	7.92	
June 26, 1911.....	1.8298	3.3428	7.73	66.00

EXPERIMENT "B."

Date of Assay	Total NH_3 In gms. per 100 c c.	U. S. P. Ammonium Carbonate. In gms. per 100 c.c.	10 per cent. Ammonium Hydroxide c.c. per 100 c c.	Alcohol per cent. Absolute Alcohol by Volume.
March 27, 1911....	1.8301	3.3696	7.64	64.50
April 27, 1911.....	1.8162	3.3196	7.66	65.00
May 27, 1911.....	1.800	3.3072	7.54	
June 26, 1911.....	1.7742	3.0986	7.97	65.00

EXPERIMENT "C."

Date of Assay	Total NH_3 In gms per 100 c.c.	U. S P. Ammonium Carbonate. In gms. per 100 c.c.	10 per cent. Ammonium Hydroxide c.c. per 100 c.c.	Alcohol per cent. Absolute Alcohol by Volume.
March 27, 1911....	1.8301	3.3696	7.64	64.50
April 27, 1911 ,....	1.8217	3.3696	7.55	
May 27, 1911.....	1.8041	3.3072	7.58	
June 26, 1911.....	1.8054	3.3348	7.50	65.68

EXPERIMENT "D."

Date of Assay	Total NH_3 In gms. per 100 c.c.	U. S. P. Ammonium Carbonate. In gms. per 100 c.c.	10 per cent. Ammonium Hydroxide c.c. per 100 c.c.	Alcohol per cent. Absolute Alcohol by Volume.
March 27, 1911....	1.8301	3.3696	7.64	64.50
April 27, 1911.....	1.0388	1.6349	5.28	65.64
May 27, 1911.....	0.251	0.2028	1.92	
June 26, 1911.....	0.0230	trace	trace	59.00

The foregoing is a tabulated list of results obtained in the monthly examinations of the above mentioned experiments, and shows the accuracy of the method, as well as the effect of storage under different conditions.

Owing to the fact that the official ammonium carbonate rapidly changes to the bicarbonate, it was desirable to get some idea as to how rapidly and how completely this change is effected.

A sample of ammonium carbonate, assaying 93.3 per cent. ammonium carbonate by the NH_3 determination, using congo red as indicator in place of litmus, and which by the way is an excellent indicator for the assay of ammonium carbonate in aqueous solution, as it is very sensitive to ammonia in presence of CO_2, but does not work very well in presence of alcohol or the volatile oils found in Aromatic Spirit of Ammonia.

By the CO_2 method, this sample was found to assay 95.91 per cent. ammonium carbonate U. S. P., showing the presence of a small amount of bicarbonate.

Pieces of this sample in translucent condition were placed on a watch glass and allowed to stand exposed to the atmosphere for 24 hours, and then assayed, gave the following results:

By direct titration with acid, using congo red as indicator, equals 99.38 and 98.87 per cent. ammonium bicarbonate.

By CO_2 determination, equals 99.23 and 99.40 per cent. bicarbonate, showing almost complete conversion from the U. S. P. carbonate into the bicarbonate with 24 hours' exposure to air.

A sample of reagent ammonium bicarbonate in hard, translucent pieces, assayed as follows:

By direct titration with acid, using congo red, equals 99.05 per cent. bicarbonate. By CO_2 determination equals $\left\{\begin{matrix}98.00\\97.99\end{matrix}\right\}$ per cent. bicarbonate.

A portion of this sample was exposed to the air, in the same manner as in the case of the ammonium carbonate, and which passed from the hard translucent condition over into the porous friable state in the same way that the official carbonate did.

On assaying this sample we got the following results:

By direct titration with acid, using congo red, equals $\left\{\begin{matrix}99.00\\99.02\end{matrix}\right\}$ per cent. bicarbonate.

By CO_2 determination equals $\left\{\begin{matrix}99.50\\98.54\end{matrix}\right\}$ per cent. bicarbonate.

which shows that in the case of the ammonium bicarbonate, the change is purely a physical one.

A liter of Aromatic Spirit of Ammonia was then prepared, using ammonium bicarbonate in order to determine whether or not the bicarbonate could be substituted for the U. S. P. carbonate, thus giving an improved formula and a more uniform, stable preparation.

The quantities of ammonium bicarbonate and of the aqua ammonia were calculated on the basis of the total NH_3 in the U. S. P. preparation with a slight excess of hydroxide over that called for in the U. S. Pharmacopœia formula.

Ammonium Bicarbonate, 99 per cent.,	42.0 gms.
Aqua Ammonia (9.98 per cent. NH_3)	125.0 c.c.
Oil Lemon	10.0 "
Oil Myristica	1.0 "
Oil Lavender Flowers	1.0 "
Alcohol	700.0 "
Aqua Distilled q. s.	1,000.0 c.c.

The aqua ammonia and 125 c.c. water were mixed in a flask, cooled, and the ammonium bicarbonate, in a coarse powder, added; this went into solution very rapidly, and the solution was set aside for about 48 hours in a cool place.

The oils were dissolved in the alcohol, cooled thoroughly and the aqueous solution added very slowly. Allow to come to room temperature, and make up to volume with water, set aside for 24 to 48 hours, then filter through dry filter in covered funnel. This was assayed in the same way as in previous experiments, with the following results:

EXPERIMENT "E."

Date of Assay	Total NH_3 In gms. per 100 c.c.	Ammonium Bicarbonate. In gms. per 100 c.c.	10 per cent. Ammonium Hydroxide c.c. per 100 c.c.	Alcohol per cent. Absolute Alcohol by Volume.
May 27, 1911.....	1.9949	4.0339	11.74	64.32
June 26, 1911.....	1.9571	4.037	11.32	64.0

Multiply the amount in grams of ammonium bicarbonate found by .2157 equals grams NH_3 existing as bicarbonate.

Conclusion.

It would seem, in view of the fact that ammonium carbonate U. S. P. is of variable composition and difficult to keep, that the use of ammonium bicarbonate, which is very much more stable, and which will answer the purpose in every way, could be used in place of the present carbonate official in the U. S. Pharmacopœia.

The method of assay, as given in this paper, has given satisfaction and has been of great help to the author in the evaluation of Aromatic Spirit of Ammonia samples.

Doubtless, it can be improved upon, but until such time, it is the most satisfactory method, for its purpose, known to the writer.

VARIATION IN THE SUSCEPTIBILITY OF THE GUINEA PIG TO THE HEART TONIC GROUP.[1]

By Chas. E. Vanderkleed, B.Sc., A.C., Pharm.D.

Pharmacologists are divided in their opinion as to the best method for determining the strength of preparations of the digitalis series by biologic means. Many papers have appeared during the last few years advocating the use of this or of that method, but a careful review of the literature shows that, in the opinion of the majority of the workers, the question narrows down to a choice between one of the frog methods, and the guinea pig method of Reed and Vanderkleed. Hatcher's proposed cat method has apparently gained no additional supporters, undoubtedly because of the complexity of its technic.

It is not the purpose of this short communication to discuss all of the many phases and problems of biologic standardization. Attention is called, however, to the fact that the frog methods and the guinea pig method are both toxic or lethal dose methods, and hence, to this extent at least, are amenable to comparison. The question of the effect of the heart tonic drugs on the respiration, in the case of guinea pigs, has been offered as one of the objections to the employment of these animals for the biologic assay of these drugs. This problem has been the subject of an extensive series of experiments during the past summer by Dr. L. T. de M. Sajous, con-

[1] Read before the Boston meeting of the American Pharmaceutical Association, August, 1911.

sulting pharmacologist of the H. K. Mulford Company, who will report on this subject during the course of the next few months. He has authorized me to say, however, that in the course of his work, by means of artificial respiration he was able at most only to prolong the life of a guinea pig to which had been administered a minimum lethal dose of tincture of digitalis for from 30 to 40 minutes. Such being the case, he believes that the effect of digitalis on the respiration in the case of guinea pigs does not materially effect the results obtained by the lethal dose method.

The most important contrast between frogs and guinea pigs as test animals lies in the claim by advocates of the latter that the susceptibility of the guinea pig, unlike that of the frog, does not vary or does not vary so greatly with climate, temperature, food, season, weight and sex. That frogs do so vary is admitted by the advocates for their employment, as shown by the suggestion by Houghton that crystallized strophanthin be employed as a standard for checking the susceptibility of each lot of frogs employed in the standardization of a preparation of unknown strength. (See also Hygienic Laboratory Bulletins Nos. 48 and 74 by Edmunds and Hale.) On the other hand, Haskell [2] has recently claimed that the advocates of the guinea pig method have only half-heartedly claimed that guinea pigs do not show the same variations. Thus he quotes Reed as saying that the guinea pig "does not *appear* to offer so wide a variation"; Githins as saying that the guinea pig "*shows* no such variation"; and the Philadelphia committee on pharmacologic assay as stating that the susceptibility of guinea pigs to digitalis does not vary under ordinary conditions, "*so far as is known.*" The effect of Haskell's quotations is to create the impression that these advocates of the guinea pig as a test animal were not at all *convinced* of the superiority of the guinea pig over the frog in this respect, and he goes on to show the possibility of a great variation in the susceptibility of guinea pigs, *to digitalis,* by mentioning an article by Arms [3] entitled "Some Freak Results from Animal Inoculation" in which that author reported on the effects of inoculations of guinea pigs with glanders, and with emulsion of nervous tissue from rabid dogs! The irrelevancy of such experiments to the question at issue only seems to indicate

[2] American Journal of Pharmacy, May, 1911, p. 201.
[3] *Journal of Public Hygiene,* xix, No. 3.

an *a priori* prejudice against the employment of the guinea pig. Haskell's further observation that the advocates of the guinea pig method have put forth unusual efforts to discover defects from the unfitness of the frog, seems to be paralleled by his implied unfitness of the former animal.

Taking up the objections to lethal dose methods in general, Haskell further states that "the active glucosides of digitalis may become decomposed into such bodies as digitalresin and toxiresin, which, resembling picrotoxin, have a depressant action on the heart, and a preparation containing a large amount of such decomposition products, while testing high by lethal dose methods, might not only be below standard, but capable of causing dangerous poisoning." In support of this possibility he quotes Edmunds and Hale in their Bulletin No. 48 of the U. S. Public Health and Marine-Hospital Service, as follows: "One solution might be very weak in its action upon the heart and yet contain decomposition products of digitalis whose typical action is upon the medulla, and it would, therefore, appear unduly strong when judged by such a standard. For this reason, we think that methods which employ as a standard the minimum lethal dose upon the higher animals are not applicable to the physiological assay of the digitalis series."

In this bulletin, however, these authors offer no evidence to show that such a condition ever obtains; on the contrary, a study of their experiments shows that they observed cases in which preparations containing large amounts of decomposition products and producing but a small or even a negative rise in blood pressure, were administered in doses four times as great as the minimum lethal dose of an active preparation without causing any symptoms whatever in guinea pigs, and they observed other cases in which such preparations were injected in doses eleven times as great as the minimum lethal dose of an active preparation without causing death. This objection to lethal dose methods, therefore, does not seem to be sustained, or at least remains to be proved. Moreover, if the minimum lethal dose method be checked by a chemical assay for digitoxin, an additional safeguard against the possibility of wrong interpretation of the physiological results is provided.

Haskell, however, goes on to say, "Doubtless, numerous investigations have been carried out to show that guinea pigs do not vary in their resistance to digitalis intoxication, but I have been unable to find the report of a single series of experiments performed

with the object of showing that guinea pigs are not fully as much influenced by adventitious circumstances as are frogs." This, being a perfectly rational and legitimate challenge, I shall endeavor to answer it, first, from a review of records of some hundreds of guinea pig injections, and secondly, by the preliminary account of a series of experiments started in July, 1911, and so planned as to cover one complete revolution of the seasons. The complete report of this series of experiments can of course only be given twelve months hence,—but some preliminary data have already been collected and may be of interest here.

Reverting to the records of guinea pig injections above referred to, I would state that the conclusions as guardedly expressed, and properly so as becomes scientific investigators, by Reed, Githens, and the Philadelphia Committee, were based upon the fact that, in the course of hundreds of injections, *apparent* variations in susceptibility were so few as to be, on the whole, negligible. In these experiments, guinea pigs bred and raised by no less than a dozen different breeders were employed. The pigs, once aggregated from these various sources, were of course subjected to approximately the same general conditions, but no unusual means of preserving uniformity were employed. Seasonable food was given them, principally oats and hay together with greens such as lettuce, carrot tops, cornstalks, cabbage, etc., in season. The temperature change to which they were subjected was that of Philadelphia, which as is well known, is a considerable one. In winter, the general guinea pig quarters are heated to 65° or 70° F., while the rooms into which they are transferred during the time of testing are heated to about 75° F. Thus, no *particular* attention is paid to the question of source, food, or temperature, nor, in the hundreds of injections made in our laboratories are any selections made as to sex. The weight of the individual animals employed has ranged from 225 to 500 gms.—the dose given being always calculated on the basis of 250 gm. weight. In spite of the lack of attempting to systematize the conditions under which the animals are kept, and tested, the percentage of non-concordant results obtained has been well within 5 per cent. By this is meant that, in finding the minimum lethal dose of any preparation down to a variation of 10 per cent., and in most cases, much less than 10 per cent., a series of pigs, taken at random, and given injections of progressively larger doses, *all* receiving a certain dose or more, will die, and *all*

receiving a smaller dose will recover. A second smaller series is always injected to check the results of the first series, and as stated above, not five pigs in one hundred have been found to die with a smaller dose than that found as the m.l.d. in the first series, or to recover, when given a larger dose—the doses being increased successively in tenths.

It was upon this evidence that the guarded opinions expressed by Reed, Githens, and the Philadelphia Committee were based. In addition to the above variations, another variation not heretofore brought out has been noted. As is well known, the guinea pig is the official test animal employed in the standardization of sera such as diphtheria antitoxin. That its use for this purpose leads to unquestioned uniformity of product is universally acknowledged, and officially sanctioned by the U. S. P. H. and M. H. Service. In the course of standardizing sera, large numbers of pigs survive, but cannot be used again for testing sera. The question naturally arose as to whether such pigs could be used for the standardization of the heart tonics. Series of such pigs have been repeatedly used along with previously unused pigs and no change in their susceptibility to digitalis and the other heart tonics noted. It is only essential that they be in good physical condition and fully recovered from the physical injury inflicted by the prior injections of toxins and antitoxin.

Taking up now the experiments started in July, I would state that the principal advantage of the guinea pig over the frog lies in the claimed non-necessity for employing and keeping on hand a "standard" against which the susceptibility of the animals must be checked. If this advantage cannot be sustained, the guinea pig method loses one of its more important claims to superiority, although it possesses some other advantages over the frog which in turn are met with certain minor disadvantages, such for example as that of cost. Confining ourselves, however, to the main question at issue, I will outline the nature of the experiment being conducted, and give a summary of results so far obtained.

The experiment has been undertaken to show what effect, if any, season (and incidentally temperature), food, weight and sex have upon the susceptibility of the guinea pig to digitalis intoxication. Recognizing the difficulty and uncertainty of keeping a standard digitalis absolutely unchanged throughout one year (and any change whatever would of course nullify the value of the

experiment), I have adopted as the standard preparation to be employed, crystallized ouabain which has been selected by advocates of the frog methods for the purpose of standardizing their test animals.

The experimental pigs have been divided first into two classes as regards sex. Each of these classes has been further subdivided into two classes as regards weight,—those ranging from 225 to 275 gms. and those ranging from 350 to 500 gms.

Each of these sub-classes was at first further sub-divided into two classes as regards food,—one class receiving for two weeks prior to the test, nothing but oats,—the other class receiving during the same time nothing but greens. It was soon discovered, however, that the pigs receiving nothing but greens easily succumbed to the unusually torrid weather which prevailed in Philadelphia and in many other parts of the country during July. Greens alone appeared to possess an insufficient amount of nourishment to maintain the animals in healthy physical condition,—several deaths occurring in the cages.

The differentiation as regards food was therefore discontinued, the fact having been proved to us that test pigs must be fed upon grain (oats) as well as upon greens in season, and that the grain is the more important. This fact, however, does not in itself discredit the guinea pig as a test animal, since we are limited very much in any case in the variety of foods which this animal will eat.

A further important observation was made during this exceedingly hot month of July. We discovered that a factor of more importance than temperature on the health of guinea pigs is ventilation,—fresh air. Our main supply of pigs is kept under conditions already described in the country. For the purpose of making these and other tests, the pigs are brought into the city, where the problem of housing and ventilation is a more difficult one. During the July 4th vacation several deaths occurred in the cages, particularly among the pigs fed on greens, and it was found that these were in fact caused by the partial lowering of the windows in their quarters by the attendant during this period, as a precaution against fire from rockets, etc. However, all this only goes to show what all pharmacologists concede, that in any biologic assay whatever, normal healthy test animals are the first requisite.

The seasonal variations will of course be shown by any differences in results noted during the year. Tests are to be made and

a new series of pigs in each of the four classes selected for the tests each month.

Thus at the end of the year, we shall have 12 sets of experiments showing the m.l.d. or resistance to crystallized ouabain, of 4 different kinds of guinea pigs, or 48 tests covering an entire year's variation in season and, to a certain extent, temperature. Moreover, if found practicable, we shall have from time to time lots of pigs shipped to us from various sections of the country,—thus introducing the factor of climate.

Up to the present time, only one set of tests has been made, the results obtained being shown in the following tables. The doses given are in grams per 250 grams body weight.

SMALL MALES, WEIGHING 140 TO 210 GMS.

Dose	Weight	Result
0.000040	195	— Recovered
0.000044	200	— Recovered
0.000047	175	— Recovered
0.000050	155	— Recovered
0.000050	210	— Recovered
x 0.0000525	205	+ Died
0.000055	195	+ Died
0.0000575	190	+ Died
0.000060	140	+ Died
0.000069	170	+ Died
0.000072	185	+ Died

M.L.D. = 0.0000525.

LARGE MALES, WEIGHING 270 TO 410 GMS.

Dose	Weight	Result
0.0000375	285	— Recovered
0.0000400	310	— Recovered
0.0000440	410	— Recovered
0.0000470	320	— Recovered
0.0000470	305	+ Died
0.0000500	270	— Recovered
0.0000500	370	— Recovered
x 0.0000525	315	+ Died
0.0000550	310	+ Died
0.0000600	345	+ Died

M.L.D. = 0.0000525.

SMALL FEMALES, WEIGHING 160 TO 210 GMS.

Dose	Weight	Result
0.00004	170	— Recovered
0.000044	210	— Recovered
0.000044	190	— Recovered
0.000047	160	— Recovered
0.000047	170	— Recovered
0.00005	180	— Recovered
0.00005	180	+ Died
x 0.0000525	195	+ Died
0.000055	175	+ Died
0.0000575	180	+ Died
0.00006	160	+ Died

M.L.D. = 0.0000525.

LARGE FEMALES, WEIGHING 260 TO 350 GMS.

Dose	Weight	Result
0.0000375	260	— Recovered
0.00004	265	— Recovered
0.00004	335	— Recovered
0.000044	295	— Recovered
0.000044	350	— Recovered
0.000047	260	— Recovered
0.000047	295	+ Died
x 0.00005	350	+ Died
0.00005	285	+ Died
0.0000525	300	+ Died
0.00006	275	+ Died

M.L.D. = 0.0000500.

Thus, it may be seen that male and female pigs ranging in weight from 140 to 410 gms. have shown a minimum lethal dose of about 0.0000525 per 250 gm. body weight, in the first month's tests. Out of 43 pigs in the series only one, (the large male which was killed by 0.000047 gm. per 250 gm. body weight while two other pigs receiving 0.00005 gm. per 250 gm. body weight recovered) died "out of order."

The m.l.d. for small females was considered to be 0.0000525, because, of two pigs receiving 0.00005 gm., one died and one recovered. The m.l.d. for large females was considered to be 0.00005 because, of two pigs receiving 0.000047 gm., one died and one recovered.

The variation in results obtained from month to month will in due season be published, and I trust that they may go far toward

establishing the degree of variation in the susceptibility of these little animals to the heart tonic drugs which should be expected.

As a matter of possible interest, the minimum lethal dose of the ouabain used in the guinea pig experiments was determined by Houghton's "one-hour" method for three classes of frogs as follows:

MALE LEOPARD FROGS (*Rana pipiens*) FROM ILLINOIS.

Weights ranged from 38.5 to 57.5 gms. Temperature of water in frog tank 26.5° to 29.5° C. Temperature of room 25.5° to 28.5° C. The doses given are in grams per gram body weight.

Dose	Weight	Result
0.000,000,30	42.0	— Beats
0.000,000,31	40.0	— Occasional beat
x0.000,000,32	45.5	+ Stopped. Extra contraction on stimulation
x0.000,000,32	55.0	+ Stopped. Extra contraction on stimulation
x0.000,000,32	56.5	+ Stopped. Extra contraction on stimulation
x0.000,000,32	57.5	+ Stopped. Extra contraction on stimulation
0.000,000,33	42.5	— Non-absorption
0.000,000,34	38.4	+ Stopped. No extra contraction on stimulation
0.000,000,34	44.0	+ Stopped. No extra contraction on stimulation
0.000,000,36	45.0	+ Stopped. No extra contraction on stimulation
0.000,000,39	40.0	+ Stopped. No extra contraction on stimulation

M.L.D. considered to be 0.000,000,32.

FEMALE LEOPARD FROGS (*Rana pipiens*) FROM ILLINOIS.

Weights ranged from 30 to 62.3 gms. Temperature of water in frog tank 26.5° to 29.5° C. Temperature of room 25.5° to 28.5° C.

Dose	Weight	Result
0.000,000,36	40.0	— Beats
0.000,000,36	34.0	+ Stopped
0.000,000,37	34.0	— Slight beat in auricle
0.000,000,37	43.5	— Slight beat in auricle
0.000,000,37	36.0	— Beats
0.000,000,38	37.5	— Beats
0.000,000,38	34.0	— Beats
x0.000,000,38	30.0	+ Stopped. Extra contraction on stimulation
x0.000,000,38	37.5	+ Stopped. Extra contraction on stimulation
x0.000,000,38	62.3	+ Stopped. No extra contraction on stimulation
0.000,000,39	50.5	— Beats
0.000,000,39	66.6	— Auricles still contracting
0.000,000,39	37.0	+ Stopped. Extra contraction on stimulation
0.000,000,39	46.0	+ Stopped. No extra contraction on stimulation
0.000,000,39	48.0	+ Stopped. No extra contraction on stimulation
0,000,000,40	40.0	+ Stopped. No extra contraction on stimulation

M.L.D. considered to be 0.000,000,38.

FEMALE BULL-FROGS (*Rana catesbiana*) FROM PENNSYLVANIA.

Weights ranged from 38.5 to 54 gms. Temperature of water in frog tank 24.5° to 26.5° C. Temperature of room 24° to 25.5° C.

Dose	Weight	Result
0.000,000,36	48.2	— Beats
0.000,000,40	41.0	— Beats
0.000,000,45	41.0	— Beats
0.000,000,47	43.0	— Beats
0.000,000,50	42.0	— Auricles still contracting
0.000,000,51	38.5	— Auricles still contracting
x 0.000,000,52	39.6	+ Stopped. Extra contraction on stimulation
x 0.000,000,52	40.0	+ Stopped. Extra contraction on stimulation
x 0.000,000,52	40.5	+ Stopped. Extra contraction on stimulation
x 0.000,000,52	38.5	+ Stopped. Extra contraction on stimulation
x 0.000,000,52	48.5	+ Stopped. Extra contraction on stimulation
0.000,000,53	40.5	— Non-absorption
0.000,000,53	48.0	+ Stopped. No extra contraction on stimulation
0.000,000,53	54.0	+ Stopped. No extra contraction on stimulation

M.L.D. considered to be 0.000,000,52.

It appears therefore that in the above experiments the minimum lethal dose for the three classes of frogs varied as follows:

Male frogs (*Rana pipiens*) from Illinois..... 0.000,000,32
Female frogs (*Rana pipiens*) from Illinois..... 0.000,000,38
Female bull-frogs (*Rana catesbiana*) from Pennsylvania 0.000,000,52

or, the lethal dose for female frogs from Illinois was about 19 per cent. greater than for male frogs from the same locality, while the lethal dose for female bull-frogs from Pennsylvania was 62.5 per cent. greater.

In conclusion I wish to acknowledge my indebtedness to Dr. P. S. Pittenger and Mr. Leo Glickman for assistance in carrying out the experimental work.

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THE THIRTY-SEVENTH ANNUAL CONVENTION OF THE NATIONAL WHOLESALE DRUGGISTS' ASSOCIATION.

By C. Mahlon Kline, Ph.B.

The Thirty-Seventh Annual Convention of the National Wholesale Druggists' Association was held last month in New York City, and, as might be expected, was very well attended. Everybody apparently at periodical intervals is looking for an excuse to go to New York, and eagerly grasped the opportunity afforded by the annual convention of the Association. There are a number of things to do in New York in addition to business matters, and when not absent from the meetings myself, noticed with regret that a number of others were. Nevertheless, in spite of the manifold attractions, the meetings were, on the whole, well attended and the discussions fairly lively.

The Hotel Astor afforded accommodations which, to my mind, were above reproach. In fact, I cannot imagine the possibility of better service, because perfection cannot be excelled.

We were particularly fortunate in having as our presiding officer, Dr. William Jay Schieffelin, a descendant of one of the most distinguished New York families, the Jays, and who is connected by marriage with another famous New York family, the Vanderbilts. Dr. Schieffelin stands out conspicuously in New York City as an advocate of what is best and cleanest in politics. He is also a distinguished lay worker in church circles. So also in pharmacy he employs the force of a more than usually winning personality in the support of those measures that tend to increase the honor and high standing of all branches of the drug trade. The Association has been very fortunate in having such a man at its head, and as chairman of its important committees, and it is very pleasing to know that Dr. Schieffelin always stands ready to assist the wholesale drug trade in maintaining its honorable position in the community.

President Schieffelin in his address touched upon many problems which are to-day agitating our country. I will not attempt to mention them in this paper, as they are constantly in the daily press, and would consume too much of your time. Dr. Schieffelin in his address said in regard to narcotic legislation: "We who are in the drug business feel the responsibility involved in dealing in these habit-forming drugs. None of us wish to make money by selling drugs which will harm our fellow men. We cannot with a clear

conscience try to prevent the passage of effective measures to control the sale of narcotics, nor is it enough for us to express our approval of such legislation and then use no effort to secure its enactment. It is our duty to be familiar with the facts regarding the effects of these drugs and the extent of their use." In this statement he clearly voiced the sentiment of those present and later a special committee was selected to assist in the enactment of desirable narcotic laws in the states and by the National Government.

Dr. Schieffelin also said in his address: "We should not confine our attention to drugs alone, because certain so-called soft drinks fortified by the addition of caffeine, on account of their habit-forming character, are a menace. There can be no doubt that their promiscuous sale to children should be stopped." He strongly advocated the establishing of a National Department of Health, because health is the most valuable asset of any nation, and there can be no more effective method of conserving human life than the spreading of sanitary knowledge by such a department of our National Government.

Among the committees to report to the Association was one presided over by a gentleman well known to you all, Dr. Adolph W. Miller, of the Committee on Drug Markets. Dr. Miller gave as his reasons for the general increase in the cost of drugs, a fact which has been forcibly brought to the attention of most of us, firstly and indirectly, the very heavy increase in the production of gold. As direct causes, the construction of the Panama Canal, requiring vast quantities of dynamite, the imposition of a tax on Cannabis Indica by the British Government, partial failure of the wine crop in France (resulting in a diminished supply of argols), the purchase of practically all of the supplies of Tonka Beans by the Tobacco Trust, the government aid extended to the citrus industry in Sicily, and the appearance of Cholera in the Mediterranean ports, producing a strong demand for Carbolic Acid and other bactericides; also, the fact that many drugs are being rejected at ports of entry and returned, making it necessary for the shipper to cover his loss by higher charges. A study of the report by items shows an advance on practically everything. Some articles seem to have reached double or triple figures.

Mr. Albert Plaut, a man generally known to possess the most accurate knowledge of medicinal substances and their market values, made a few interesting remarks in commenting on Dr. Miller's

report, which I shall summarize as follows: He said that he thought that the value of drugs and medicines had increased less in the last 15 years than any other commodity. "During the current year there have been a large number of increases and I have remarked, when discussing the subject, that at last the drug trade was coming into its own, that we were also getting our fair share of the depreciation of the value of gold and the consequent increase in price of commodities. I hold that drugs are sold entirely too low in price, and that the countries where the various drugs are indigenous are superlatively foolish in selling these goods below their real value. Take the American indigenous drugs produced chiefly in the South; the dried roots are sold right along at from 3 to 8 cents a pound. How human labor can be adequately paid for gathering dried roots to be sold at from 3 to 8 cents a pound is beyond my comprehension."

Mr. Plaut mentioned as examples of drugs which have heavily increased in value owing to crop conditions, Buchu, which sold for 30 years all the way from 6 to 12 cents a pound; then came a crop failure, speculators took hold of the product and it sold as high as $1.00 a pound, and he ventured to say that it will never again be below 40 or 50 cents a pound. Golden Seal Root is another one. Mr. Plaut said he could remember when Golden Seal was 9 cents. For years it sold from 18 to 20 cents, then for years around 85 cents, at the present time it is $5.00 a pound. He ventured to prophesy that we will never see the low prices again. Mr. Plaut thinks the Food and Drugs Act has something to do with the increase in the cost of drugs, because it is no longer possible to market drugs which have been carelessly collected, and higher prices must be obtained in consequence.

I think you will also be interested in a part of the report on paints, oils and glasses, Mr. Levi Wilcox, of Waterbury, Conn., Chairman. He called the attention of the Association to Lard Oil, official in the U. S. P., Eighth Revision. Mr. Wilcox said that the purchase of this product by one not an expert is quite a difficult problem. One may solicit quotations for prime lard oil from half a dozen different sources at the same time, and have a different price named by each one, and should he purchase a barrel of each of the oils offered, he might find as many different qualities of oil, varying from the finest selection of prime winter strained oil down to a poor off-prime oil adulterated with 50 per cent. of petroleum. To

prove the truth of this assertion, Mr. Wilcox made a series of such purchases with results exactly as stated above. The conclusions are:

1. That there are no definite legal standards of equality for the different grades of lard oil.

2. That each producer or dealer selects and classifies his lard oil by his own standard tests, and according to his own ideas.

3. That the commercial names, prime, off prime, No. 1, etc., established by custom for marketing the different grades of lard oil indicate little as to the actual quality of the oil.

In fairness it should be said, however, that lard oil purchased direct from the large packing houses is usually of the highest quality. Mr. Wilcox suggests as a cure for this condition, that the producers of lard oil should adopt a series of standard tests of the different grades. Mr. Wilcox further states that the whole subject of adulteration of products not covered by the Pure Food and Drugs Act, will be eventually covered by a general statute forbidding misrepresentation of chemicals, oils or other commercial articles.

In objecting to such legislation there is the argument that such laws are useless duplications of existing statutes, under which fraud is already a crime. Mr. Wilcox argues that the answer to this is that the new law should make it a duty of the State to investigate, whereas, under the present law prosecution for such misrepresentation has to be instituted by the individual.

If I might be pardoned for injecting an opinion on this subject, I am more in sympathy with those that doubt the advisability of such legislation than with Mr. Wilcox. It seems to me in these days that there is a tendency to pass many laws which add but little to the common law already in existence, and do but complicate and interfere with business. I am rather inclined to object to a paternal government. The citizens of this country have done unusually well so far by an exercise of their wits. It seems to me that too much paternity on the part of the government does away with the necessity for the exercise of individual brains. It makes the inhabitants lacking in the ability to take care of themselves.

My remarks, however, are not intended to apply to Foods and Drugs where the health of the inhabitants are at stake. The legislative function of government is intended for just such a purpose, the guarding of the public health, police powers and the protection of property. It seems to me desirable to think very seriously before we extend government control by the standardizing of all

products, such as cloth, measuring vessels, building materials and a million and one other commodities that figure in our transactions. Let the American citizen depend on his own brains and permit him to do his own choosing. It seems to me he will be a better man for the experience, but do not allow him to become the prey of the food and drug adulterators who strike at his health.

Mr. Lilly, Chairman of the Committee on the Prevention of Adulteration, presented, as might be expected, a very able report. He was very optimistic. He thought that deliberate adulteration of drugs has become so rare as to be almost a thing of the past, and that where adulterations were traced to their source, they proved to be due almost invariably to ignorance on the part of the collector. Mr. Lilly's opinion does not agree with that of the President of the Association of State Food and Drug Commissioners, whom I heard announce before a meeting of the National Civic Federation recently that he was firmly convinced that 60 per cent. of all the medicines sold to-day were adulterated. How such blind ignorance could exist in the mind of a man occupying so important a position, is to me absolutely without excuse. People in positions of authority should inform themselves first of facts and talk afterwards. The number of words in circulation would thus be very remarkably diminished.

Mr. Lilly, on the other hand, realizes and says, that progressive business men, aided by a growing number of scientists, have for years been elevating the standards and eliminating adulteration. This I think is very correct. It is not that people deliberately adulterate, but they are misled through ignorance where there are no standards in existence. Wherever these men are shown the right, they follow it with avidity. Again, it must not be forgotten that our ignorance to-day of medicinal substances is appalling. Until the darkness of this ignorance is dispelled, how can we expect to reach protection!

Mr. Lilly says that most of our difficulties now come from indigenous drugs. Gatherers of crude drugs in our own country are not often educated botanists, hence it is not to be wondered at that admixtures with other drugs should occur. He mentions Wild Cherry Bark as a case where the forbidden old Bark will be stripped and mixed with the young bark. This, however, seems to me to be deliberate and not the result of ignorance. He mentions also the adulteration of Hydrastis with the twin leaf root, because of its high price and scarcity. Leptandra continues, he says, to be

a favorite vehicle for soil, gravel and chicken feathers. The second year woody roots of Lappa continue to be mixed with one year root. Spigelia is difficult to secure free from wrong species and strange rhizomes.

Mr. Lilly mentioned the important fact, which I have previously dwelt upon, that knowledge of drugs in many cases has made little or no progress for years, in spite of a great advance made in our knowledge of medicines as a whole. He takes as an example Stillingia; he says there is some truth in the statement that it loses its therapeutic value rapidly upon drying and becomes inactive within a year. He says, however, that this is a surmise, and it would require years of elaborate study before coming to a definite conclusion. He brings up this point to illustrate that a correct standard cannot be established until our knowledge of the particular drug has reached the point of reasonable completeness. This, it seems to me, is the most important matter Mr. Lilly brings us in his report. There is not nearly enough time and money spent on investigating our usual drug substances. Hardly one of them can be considered without some question arising in connection therewith, and a search of the existing literature will not bring a reply.

Mr. Lilly dwelt upon the difficulty experienced by analysts in securing samples for assay. Large lots are frequently made up of assembled small lots brought in by different growers or collectors, perhaps collected and mixed in widely separated localities. These lots when placed in bags or pressed into bales present a problem to the chemist. A standard method for preparing such samples is being discussed by analysts, and it is to be hoped that an effective method may become official. It seems to the writer that in many cases it will always be impossible to obtain uniform samples without taking the entire lot and grinding it into a powder and then mixing the powder, or, in the case of soft and unctuous materials, mixing them in a large machine until they become homogeneous, which procedure would not be, of course, practicable.

Speaking about Asafetida, Mr. Lilly said: "Surely Powdered Asafetida should be abolished. The heat necessary to dry and the unavoidable admixture of gypsum or other diluent in large proportions makes the product undesirable. Here is quality sacrificed to convenience and should be abolished." The writer must say that he cannot see any possible excuse for the existence of Powdered Asafetida. He is informed that this product depends almost en-

tirely for its activity on its volatile constituents, which are partially or entirely driven off in the drying. Why then should any one who has knowledge of the facts employ this powder in the important conditions in which Asafetida is employed?

Mr. Lilly concludes—and his conclusions are very pleasing—"To sum up the situation as to the adulteration of drugs in the United States, your committee feels that by continued alertness on the part of the government examiners, the growing habit of dealers and manufacturers of carefully examining their crude materials and rejecting all those below standard, together with the increased co-operation of wholesale and dispensing druggists who are as a rule possessed of a sincere desire to supply the people of this country with the best drugs obtainable, that the situation is increasingly gratifying. Where all are struggling for better things the desired goal will surely be reached."

The association had the good fortune to be addressed by Dr. Rodney H. True, the physiologist in charge of the Bureau of Plant Industry of the Department of Agriculture. Dr. True addressed the association on the subject of what is now being done toward encouraging the artificial growing of drugs in the United States. This is one of the very important undertakings of the United States Department of Agriculture, and one which we all hear about with the very greatest interest. Much of the loss of reputation under which drug substances have suffered in the past is undoubtedly due to lack of knowledge of the drugs themselves. The investigations of the Department not only make it possible for the inhabitants of the United States to reap some of the golden harvest previously sent abroad, but lead to the discovery of many points in regard to growth, age and method of collection that are very certain to lead to greater uniformity. Dr. True mentioned as drugs which were of sufficient value to make experimentation worth while, Ginseng, of which this country exports from $1,000,000 to $1,500,000 a year to China; Golden Seal, Cannabis Indica and Senega Root. Ginseng has to be grown under artificial shade. Apparently the results have been most encouraging, Dr. True mentioning the possibility of a harvest of $10,000 per acre.

Golden Seal also has to be grown under shade. Dr. True said it is being planted in rotation with Ginseng all over the Northeastern part of the United States. He says, however, that the growers have been so much impressed with the market advances on

Golden Seal that they prefer not to gather, but are using the present plants for the purpose of propagation, and that the artificially home grown drug, though at present in existence in sufficient amount to relieve the present stringency, will probably not be gathered until the growers think the market has reached its highest point. This has been the experience with Ginseng. "You have seen," he says, "how *long* Ginseng has been coming on the market; the reason has been the increasing prices. For the past few years it has *not* been increasing in price, so now the cultivated roots have begun to appear." The value of Ginseng has reached an approximate level, which the growers have realized, and they have put it on the market. How long it will be before the same situation applies to Golden Seal is impossible to state.

Dr. True says the Department is having very gratifying results on Cannabis Indica, which grows very nicely in Maryland and in a very considerable part of the United States. He said that they had settled down to experiment work in South Carolina and in the vicinity of Washington; that they had made extracts and applied tests to dogs and found the Indian Hemp grown in Texas and in the neighborhood of Washington like effective, as effective as good standard extracts bought from the most approved sources. One serious handicap in the growing of Indian Hemp is that the United States Pharmacopœia states that Indian Hemp must come from the East Indies.

Dr. True said that, in collaboration with Dr. Hale of the Hygienic Laboratory, they worked on Digitalis Leaves at the Arlington Experiment Station, and found that the first year Digitalis Leaves are as effective as those produced at the time of flowering. (The U. S. P., you will recall, recognizes only the second year leaves.) Dr. True, however, did not know whether this would be the case every time, but they have reason to believe that the first year's leaves will meet the physiological requirements.

He did not speak very encouragingly about other drugs of smaller value. Apparently, at least for some years to come, the only drugs in which the growers can be made to take an interest are those of considerable value, as American growers are unsatisfied with the possibility of small returns.

Dr. True discussed the difficulty of matching climatic conditions, using Opium as an example; he attempted to grow poppies for Opium in Florida with poor results, and after three or four more

guesses found by far the best location to be in the State of Washington near Spokane. He said that he would not have thought at first that this location would parallel the conditions in Asia Minor. The growing and curing of Vanilla Beans did not look promising as far as they had gone. Dr. True spoke in a very encouraging way of the success they are having in the propagation of Camphor trees in Florida.

The most important consideration brought up by the Committee on Legislation, Chairman, Mr. Chas. A. West, was uniformity in legislation. The United States has now grown beyond the provincial stage and so, naturally, the business of the United States has also grown until the large dealers have representatives in every State in the Union. This is as it should be, and tends to bring about those economies which should ultimately redown to the advantage of the consumer, though so far they do not seem to have done so. In any event, a manufacturer should be able to market his goods freely in every State in the Union. Lately, however, the 48 legislatures, meeting every two years, have found it necessary to consider, and at times pass, all sorts of ill-advised legislation, regardless of national conditions. This is recognized to-day by the business community as one of the most serious problems that confronts us, threatening the prosperity of our country. The National Civic Federation has shown a progressive spirit by organizing committees throughout the United States to make legislation, as far as possible, uniform. We have been fortunate so far in getting comparatively uniform laws on foods and drugs, though there have been many narrow escapes from legislation which would have interfered with this uniformity.

Mr. West looks with apprehension upon the Narcotic Bills that have been introduced in Washington during the extra session and the session that preceded it. He thinks that these bills approach the subject from the wrong standpoint. They make it necessary for the shipper to keep elaborate and cumbersome records and to make himself responsible, to a certain extent, for the character and actions of the man to whom he ships. Whereas, it is very evident, that it is the purchaser of drugs of this character who is the dangerous man, and he is the person who should be made responsible for the disposal of the narcotic drugs which he has purchased.

It seems to me that Mr. West's position is most reasonable. Part of his statement, which seems very important to me, I quote from the stenographer's report of the proceedings. It is as follows:

"It seems to your committee that the course for this Association to pursue is to submit some compromise measure that will be quite as likely to accomplish the purpose of these drastic bills, and at the same time not make it dangerous for a reputable citizen to engage in the business of manufacturing and wholesaling drugs. The question arises: Is not one who is disposed to buy from a dealer in another State for the purpose of evading the laws of his own State the one for the legislator to reach? The manufacturer and wholesaler shipping hundreds of orders every day has no possible opportunity of knowing who are, and who are not, buying for lawful purposes; but the dealer cannot import a drug into his State for the purpose of evading the State law innocently; therefore, might it not be wise to submit, as meeting the evil claimed to exist, a measure which shall reach the dealer importing for unlawful purposes? A Federal act might be passed first forbidding anyone not a manufacturer, a wholesaler, a retailer and perhaps a physician, dentist or veterinarian, from importing the prescribed drug into his State from any other State; and the same law might require the manufacturer, dealer, etc., lawfully importing from other States to transmit to the collector of internal revenue for his district a copy of his order, which such collector might keep filed for the information of the local authorities. This would impose little, if any, hardship upon those introducing into the State from other States, since such orders are infrequent; while this simple proceeding would accomplish every purpose that either the Mann bill or the Foster bill is intended to effect."

In conclusion, I would say that, to my mind, the meeting of the National Wholesale Druggists' Association shows very clearly the tendency of the times. The wholesale dealers of 10 years ago were not, nor did they have to be, familiar with the professional side of pharmacy. This condition is not true to-day. The wholesaler has been compelled to assume responsibilities as to the quality of the drugs and medicines he handles, and this has driven him to interest himself in the study of drug substances, therefore, discussions having to deal with quality, standards, scientific methods of production or handling, are now heard with the greatest interest, and the purely commercial side has been forced to recede somewhat from its former pre-eminent position. This I think is bound to result in considerable benefit to the consumer of medicinal substances. As Mr. Lilly has said: "Where all are struggling for better things, the desired goal will surely be reached."

THE THIRTEENTH ANNUAL CONVENTION OF THE N. A. R. D.

By William E. Lee.

The Convention of the N. A. R. D. at Niagara Falls was to my mind one of the most successful conventions that it has been my privilege to attend. It was a representative body of the retail druggists of the United States, truly national in its character. Anyone who has not attended a national convention of the N. A. R. D. has no idea what they have missed. It is not only the sessions of the convention by which you are benefited, but the meeting with fellow druggists from different parts of the country; exchanging ideas, becoming acquainted with each other, also the satisfaction of knowing that druggists are among the most enterprising citizens of this country. Here you meet the men that have been successful in their business and their profession, and are always ready and willing to give any desired information. The time and money spent by druggists is conclusive evidence of their loyalty to their profession.

I have in mind one man in particular who rode twenty-five miles on horseback to get to a railroad station to attend the convention at Niagara Falls. I might say that he was from Kentucky.

The addresses were interesting and instructive, among them was one by Professor Beal, the delegate from the A. Ph. A., which was listened to with marked attention and was thoroughly appreciated.

The movements tending to Sunday Closing and Shorter Hours for Pharmacists were approved of and the reports from different parts of the country indicated that the movement is progressing, and in my opinion it will continue to grow.

Dr. Wiley's work for pure food and drugs was endorsed after quite an animated discussion.

The report of the Committee on National Legislation was very satisfactory, the work accomplished proved the great amount of labor expended by the committee, particularly the chairman, Mr. W. S. Richardson of Washington, who is always ready and willing to labor for this cause.

The Committee on U. S. P. and N. F. propaganda gave an interesting report, stating that the use of U. S. P. and N. F. preparations in prescriptions had increased from twenty-five to fifty per cent., which to my mind is a very good showing.

The report of the Treasurer showed the largest balance in the history of the Organization.

The report of the Secretary, Mr. Thomas H. Potts, secured the endorsement of the association. Mr. Potts is a graduate of the Philadelphia College of Pharmacy, a man who has been greatly missed in the drug circles of Philadelphia, honored and respected throughout this country and one who is doing everything that lies in his power to benefit the retail druggists. His unanimous re-election to the Secretaryship shows that his devotion to and faithful performance of the duties pertaining to this office were fully appreciated.

The Procter Memorial Committee was given two hundred dollars in lieu of soliciting subscriptions from the members, which I think was a commendable plan.

The future of the association, I predict is a great one. I can see each year a marked improvement over the previous one. It appears to me that it is realized that the commercial side of our profession is a very important branch of it, and it is no doubt that it is the mission of the N. A. R. D. to develop and improve the commercial conditions of pharmacy, and I am satisfied that much is being accomplished.

The officers elected for the ensuing year are bright, active, and energetic men, and I have no fear but that they will render a satisfactory report at the coming convention of 1912.

In conclusion, let me say that I hope every retail druggist in the United States will realize the importance of becoming a member of this great organization.

ABSTRACTS OF STATE PHARMACEUTICAL ASSOCIATION PAPERS.

By John K. Thum,
Pharmacist at German Hospital, Philadelphia.

Variations in the Form of Digitalis Hairs.

By Henry Kraemer.

The author states that while much attention has been given to the pharmacognosy of digitalis, the studies have mostly been along lines to differentiate digitalis from other leaf drugs occasionally substituted for the real drug. The writer expresses the fact that the adulteration of this drug or its substitution is very rare. Although digitalis has been in use as a medicinal for some 400 years and many conflicting statements are still made regarding its

efficiency and deterioration of its preparations we may well ask how much real progress has been made in the solution of the problems which this drug with its complex constituents offers. He then goes on to say that while it is true that there are methods for the biological standardization of this drug and its preparations, yet these do not enable us to determine in advance which lot of the drug will, in a given instance, be found valuable and which will be of inferior quality. No work on this important drug will be complete until we can determine either by chemical analysis or through pharmacognostical studies the differences between different samples of drug. While various pharmacopœias require that leaves only from second year plants shall be used, and at present there is a tendency to make it a requirement that the leaves shall be thoroughly dried and stored in containers with freshly burnt lime, yet recent investigations tend to show that the leaves of the second year plant are relatively but slightly more potent. And we know that certain practitioners use only the tincture made from the fresh drug. In spite of the fact that many pharmacopœias require that leaves only of the wild plants should be employed it is the practice of many discriminating pharmacists in the United States to employ the leaves of the cultivated plant.

Referring to the papers of Hartwich and Bohny on digitalis, he mentions that their observations show many variations in the structure of wild plants and those selected from cultivated varieties. That the leaves of wild digitalis are usually more hairy, that the cells of the hairs are shorter and broader and that the outer walls of the middle and lower cells of the non-glandular hairs are papilose. Vogl mentions the fact that the end cells are occasionally either finely striated or finely papilose. As a matter of fact the observations of both of these authors are correct. In regard to the number of cells making up these non-glandular hairs, Vogl states that they are mostly 3-celled, Hartwich and Bohny say that they are usually 2- to 4-celled and seldom 5- to 6-celled, and Greenwich records the fact that they may be as many as 10-celled long. While the author has not been able to confirm Greenwich's observation, he has seen specimens in which many hairs were 7 to 8 cells long, and believes that Greenwich's statement can be confirmed.

The author states that the hairs of many plants contain active principles; the nature of the secretory substances in the hairs of digitalis is unknown, yet in certain specimens we find a preponderance of glandular hairs and it may be that the minute study of these

hairs will throw some light on the variation in the drug (Penn. Pharm. Assoc.).

Is Formaldehyde Produced upon Heating Sugar?

By W. B. Meade.

The author subjected powdered sugar, contained in a flask, to heat ranging from 80° C. to 200° C., the outlet tube of the flask leading into a test tube, containing water. Three experiments were tried. None of the distillates gave the reaction for formaldehyde when treated with the Rimini, U. S. P. resorcinol and the HCl, iron peptone tests (Penn. Pharm. Assoc.).

The Pharmacognosy of Echinacea.

By Henry Kraemer and Maud Sollenberger.

The authors state that although Echinacea augustifolia has been used in certain proprietary medicines for a number of years, it was not until 1886 that the identity of the drug was determined. They also state that while the drug is largely used, the Council on Pharmacy and Chemistry of the American Medical Association has investigated it and deem it unworthy of further consideration until more reliable evidence is presented in its favor.

The drug and plant have a number of interesting anatomical features and the results of their study by the authors were obtained from authentic specimens of the crude drug and cultivated living plants which have been growing for some time in the garden of the Philadelphia College of Pharmacy.

There are two species of *Echinacea* indigenous to the United States and known under the generic name of *Brauneria*.

The authors give a very minute description of this plant which they state is a perennial herb. In speaking of the microscopical structure they state that the outer portion of the rhizome and root consists of 2 to 4 layers of more or less tabular cork cells with somewhat thickened yellowish suberized walls, the cells being frequently filled with more or less spherical globules of a substance which may become changed to a granular form.

In their study of the intercellular substance they found that the oleoresinous canals or reservoirs are of the general type occurring in the Tubuliflorae. They are found in the wood and bark. The contents are light yellowish, amber-like in color and of an oily or resinous consistence (N. J. Pharm. Assoc.).

Fluidextract of Echinacea.

By George M. Beringer.

As it is proposed to introduce a formula for Fluidextract of Echinacea in the next revision of the N. F. the writer of this paper tried exhausting this drug with various strengths of alcohol and water. The best result in his judgment was obtained with a menstruum of alcohol 4 volumes and water 1 volume (N. J. Pharm. Assoc.).

Detection and Estimation of Talc in Some Forms of Confections.

By Charles H. LaWall.

The author gives a method for estimating the talc used by confectioners in coating candies. As the amount of talc is usually too small to permit of estimation by direct ignition, the author devised the following process which he states is convenient and trustworthy.

Two grammes of the sample are placed in a heavy beaker, covered with about 250 c.c. of distilled water and allowed to stand one minute. The liquid is poured off closely and this treatment repeated twice. With this class of confectionery the washing is always somewhat turbid, as some insoluble coating or polishing material is used, but when talc is present in the finely powdered foliated form the characteristic satiny lustre is easily perceived. The wash liquors are passed through an ashless filter, the filter dried, ignited and weighed. If talc has been used as a coating, the ash will range between 0.25 gm. and 0.40 gm. A microscopic examination is made of one portion of the ash, the remainder is fused with sodium carbonate and the SiO_2 and MgO estimated in the usual manner. A proportion of about 55 per cent. of SiO_2 and 35 per cent. of MgO should be obtained, confirming the presence of talc, which is a hydrated magnesium silicate (Penn. Pharm. Assoc.).

Headache Remedials.

By Philemon E. Hommell.

The author goes over the list of drugs used in the treatment of headache before the introduction into medicine of the coal tar derivatives. He states that while the drugs mentioned did not relieve as readily as the synthetic remedies, yet there were few, if

any, fatalities; this, he says, cannot be said of acetanilid or like products.

In order to obtain the gratifying results of acetanilid without its attendant disadvantage he recommends its exhibition in fluid form. More satisfactory results follow its combination with caffeine, nux vomica and aromatic spirits of ammonia.

He suggests the following formula:

ELIXIR ACETANILID COMPOUND.

Acetanilid	320 grs.
Caffeine	32 grs.
Tinct. Nux Vomica	256 minims.
Spts. Ammonia Aromatic	8 fluidounces.
Purified Talcum (U. S. P.)	120 grs.
Aromatic Elixir (U. S. P.)	to make 16 fluidounces.

(N. J. Pharm. Assoc.)

Powdered Blaud's Mass.

By George M. Beringer, Jr.

The author says that there is considerable demand for the time-honored "Blaud's Mass" in powdered form and as the manufacturers are listing such a preparation a formula for its manufacture should receive official recognition.

The formula which we give below he has used with success.

Exsiccated ferrous sulphate	105 gms.
Potassium carbonate	80 gms.
Powdered sugar	105 gms.
Powdered acacia	10 gms.

Rub the potassium carbonate with 10 c.c. of water and add the other ingredients, previously mixed. Rub till evenly colored. Dry in an oven and powder. Preserve in tightly stoppered bottles (N. J. Pharm. Assoc.).

The N. F. Pepsin Preparations.

By Philemon E. Hommell.

The author enumerates the whole list of pepsin preparations contained in the present edition of the N. F. and states that they were introduced from time to time to replace those of a proprietary nature. Few of them are prescribed nowadays and from a thera-

peutic standpoint he believes it was foolish to have ever introduced so many pepsin preparations in the National Formulary, especially those containing more than 10 per cent. of alcohol, which always impairs the digestive properties of the pepsin. He then remarks that the employment of pepsin as a therapeutic agent has been greatly overestimated. Tons of it have been wasted and so has considerable money for its many useless preparations. He makes a plea that the N. F. limit the pepsin preparations (N. J. Pharm. Assoc.).

THE DETERMINATION OF CAMPHOR.[1]

By H. C. Fuller,
Assistant Chemist, Division of Drugs.

The extensive use of camphor in medicine and the fact that the Pharmacopœia includes preparations which must contain definite quantities of camphor make it imperative that there should be a reliable method of assay. There have been in vogue for some time procedures depending on the rotation of an alcoholic, benzol, or oil solution and on the loss by evaporation, but they are open to objection, and in certain instances the results might easily be misinterpreted. Artificial camphor is without rotatory power, natural camphor might contain a portion of the levo body, the rotation varies with the strength of the solvent, and fixed oils themselves on heating often undergo loss or gain in weight. These are a few of the reasons which call for a method based on a more substantial foundation.

Camphor, being of ketonic character, forms with hydroxylamin a well defined oxim $C_{10}H_{16}NOH$, and advantage has been taken of this property in assaying camphor preparations, the procedure being based on Walther's [2] carvone estimation and on the work of Nelson,[3] who determined in essential oils by the hydroxylamin method a number of keptones including camphor. The procedure is simple and may be applied directly to spirits of camphor. Of the sample 25 c.c. are measured into an Erlenmeyer flask of 100 c.c. capacity, 2 grams of sodium bicarbonate are added, and then,

[1] Circular No. 77, Bureau of Chemistry, U. S. Department of Agriculture.
[2] *Pharm. Centralhalle*, 1900, **41**; 613.
[3] U. S. Dept. Agr., Bureau of Chemistry Bul. 137, p. 186.

accurately, from a burette, 35 c.c. of a hydroxylamin solution (20 grams $NH_2OH.HCl$ + 30 c.c. H_2O + 125 c.c. absolute alcohol aldehyde free). The flask is connected with a reflux condenser, and heated to gentle boiling for two hours; it is then cooled to 25° C., treated with a mixture of 6 c.c. hydrochloric acid (1.12 specific gravity + 6 c.c. water), transferred to a 500 c.c. volumetric flask, rinsing out the condenser and flask with water, and finally made up to volume; 50 c.c. portions are filtered off and titrated as follows: Methyl orange is added and the mineral acid neutralized with normal alkali, then phenolphthalein is added and the hydroxylamin hydrochlorid titrated with tenth-normal alkali. A blank must be run using the same amount of hydroxylamin solution and 25 c.c. of alcohol to correspond with the spirits of camphor, the difference in titrations representing the hydroxylamin converted into camphor oxim. Each cubic centimeter of tenth-normal sodium hydroxid is equivalent to 0.01509 gram of camphor.

NEW ESSENTIAL OILS.[1]

Oil of Artemisia cærulescens, L.—Of this plant, which belongs to the N. O. Compositæ, and occurs on the littoral of the Mediterranean and, in parts, on that of the Atlantic, a sample has reached us from Turin under the name of *Erba Santa Maria.* We obtained from it 0.24 per cent. of an oil which, in its odor, showed a certain similarity to oil of hyssop, but at the same time reminded somewhat of ambrette. At room temperature it appeared as a brownish, butter-like mass, studded with white crystals, which only between 35 and 40° dissolved into a pale brown liquid. Its constants were determined as follows: $d_{40°}$ 0.9179, α_D — 5°50′, acid v. 11.3, ester v. 42.0, insoluble in 80 per cent. alcohol, soluble in any proportion in 90 per cent. alcohol, with separation of a solid substance. The crystals isolated from the oil, after being recrystallised from alcohol, formed fine, white odorless needles, m. p. 108°; so far their chemical characteristics have not been further investigated.

Cardamom Root Oil.—From cardamom-roots from Indo-China we have obtained a yield of 0.64 per cent. of a lemon-yellow oil

[1] From Semi-Annual Report, Schimmel & Co., October, 1911, p. 104–109.

possessing a peculiar, aromatic odor, which bears no resemblance to that of the oil from seed. So far our attempts to ascertain the parent-plant of the oil have been unsuccessful. The oil gave the following constants: $d_{15°}$ 0.9066, α_D—32°57′, $n_{D20°}$ 1.48151, acid v. 3.7, ester v. 87.9, ester v. after acetylation 96.7. The oil was soluble in 0.5 vols. 95 per cent. alcohol; when more alcohol was added the mixture rapidly turned turbid, and did not become clear again until the solvent had been increased to 4 vols. Fractional distillation under diminished pressure (5 mm.) gave the following result:

1.		to 35°	— 5.4%	α_D— 0° 10′
2.	35	" 40°	— 8.7%	α_D— 0° 32′
3.	40	" 100°	— 5.4%	α_D—17° 5′
4.	100	" 110°	—10.6%	α_D—31° 10′
5.	110	" 115°	—44.2%	α_D—45°
6.	115	" 145°	— 6.4%	α_D—33° 14′
7.	residue		19.3%	α_D—39° 15′

Fractions 1 and 2 contained cineol, which was identified from the double-compound it gave with resorcinol. From fractions 4 and 5, a portion boiling between 117 and 120° (5 mm.) was separated by repeated fractionation. Saturated with hydrochloric acid gas in dry ethereal solution at — 18°, this fraction yielded a hydrogen chloride compound which, when recrystallised from methyl alcohol had m. p. 79 to 80°. The hydrochloride was inactive; the chlorine-determination gave the following result:

0.4306 subst.: 0.5928 g. AgCl

	Found	Calc. for $C_{15}H_{24}$, 3HCl.
Cl	34.06%	33.9%

Our surmise that we had here before us the hydrochloride of bisabolene was confirmed by further examination. With sodium acetate and glacial acetic acid a sesquiterpene was eliminated from it which, when twice fractionated, was found to possess the following constants: 265 to 267° (757 mm.), $d_{15°}$ 0.8748, α_D + 0°, $n_{D20°}$ 1.49063. With hydrochloric acid this hydrocarbon yielded again the trihydrochloride melting between 79 and 80°.

The residue of distillation of cardamom-root oil solidified at about 15° with separation of paraffin; the last-named body, when recrystallised from alcohol, melted at 62 to 63°.

This examination shows the presence in cardamom-root oil of

cineol, bisabolene and a paraffin; bisabolene being the principal constituent.

Cedarwood Oil, East African.—The wood of the red cedar (*Juniperus virginiana*, L.) which comes from Florida and is used in the manufacture of lead-pencils, is becoming more and more scarce, but up to the present no other wood has been found capable of replacing it, which is all the more regrettable because in all probability there does not exist another industry so wholly dependent upon a single kind of wood. Recently, however, large forests of a cedar-species which affords a wood apparently very suitable for pencil-making, have been discovered in German East Africa.

A short time ago we were enabled to distil a large parcel of the wood of this East African cedar. Dr. Giessler informed us that the wood was derived from *Juniperus procera*, Hochst., a tree which occurs in the mountains of Abyssinia and Usambara, as well as on the slopes of the Kilimanjaro and the Kenia. The tree grows at altitudes of from 4500 to 9000 feet and in Usambara it forms extensive forests. In its anatomical structure the wood bears a great resemblance to that of *Juniperus virginiana*.

Shavings and short planks constituted our raw material. The former yielded by distillation 3.2 per cent. of a deep-yellow, liquid oil with an odor distinctly resembling that of vetiver, and giving the following constants: $d_{15°}$ 0.9876, $n_{D20°}$ 1.50893, acid v. 14.9, ester v. 8.4, ester v. after acetyl. 70. The oil itself being too dark to permit the reading of its opt. rot., this constant was determined from a solution of equal volumes of oil and alcohol, and found to be — 3° 43′, in a 2 cm.-tube, which would correspond with a rotation of — 37° 10′ in a 100 mm.-tube for the original oil. The oil was soluble in 1.6 vols. a. m. 80 per cent. alcohol and in one half its own vol. a. m. of 90 per cent. alcohol.

The short planks, after being broken up, yielded about 3.24 per cent. of an oil which formed at ordinary temperature a semi-solid mass studded with crystals. When drained off from the crystals the oil gave the following constants: $d_{15°}$ 1.0289, $n_{D20°}$ 1.51011, acid v. 27.06, ester v. 7.93, ester v. after acetyl. 89.6. In this case also it was impossible to ascertain the rotation of the original oil; but when diluted with its own volume of alcohol, it gave — 3° 15′ in a 20 mm.-tube, equal to 32° 30′ in a 100 mm.-tube for the original oil. The oil was soluble in 2 vols. a. m. 80 per cent. and in one-

half its own vol. 90 per cent. alcohol. The crystals consisted of cedar camphor. Recrystallised from alcohol they melted at 86 to 87°, sp. rot. + 10.12° (2.5517 g. substance dissolved in 25 cc. chloroform). The phenylurethane melted at 106.5°.

Oil of Cinnamomum Burmanni.—Two lots of cinnamon bark which had been sent to us from the islands of Celebes and Timor, their respective producing districts, when anatomically examined by Dr. Giessler proved to be identical, the parent-plant of both, according to this authority, being *Cinnamomum Burmanni,* Blume (*C. Kiamis,* Nees), N. O. Lauraceæ.

Distillation yielded us 0.5 per cent. of a brownish-yellow oil with an aroma resembling that of Ceylon cinnamon oil, but less delicate. The constants of the oil also differed from those of Ceylon cinnamon oil, being: $d_{15°}$ 1.0198, α_D − 1° 50′, $n_{D20°}$ 1.58282, soluble in 0.8 vols. 80 per cent. alcohol and more; giving no clear solution with 10 vols. 70 per cent. alcohol. The cinnamic aldehyde content, as determined with neutral sodium sulphite, was 77 per cent., while a determination with bisulphite showed about 80 per cent., but in the latter case the result was very untrustworthy, probably owing to the fact that other aldehydes were also present, and that their bisulphite-compounds separated out from the solution and prevented an accurate reading. The determination of phenols with 3 per cent. soda liquor gave a phenol-content of about 11 per cent. Unfortunately part of the oil had become emulsified during the shaking with the soda liquor, hence it was impossible to read off accurately those parts of the oil which had not entered into reaction. The value given above is therefore only approximate.

Oil of Matricaria discoidea.—Among the numerous plants of the N. O. Compositæ which have been introduced among us from North America is *Matricaria discoidea,* D. C., a plant resembling our chamomile, but smaller and also particularly differing from our chamomile in having much smaller marginal flowers. The plant was introduced into Europe in the middle of the nineteenth century and has acclimatised itself with surprising rapidity; being, for instance, very common in Württemburg and in many parts of Alsace-Lorraine, in particular in the neighborhood of railway-stations.[1] We have also observed this chamomile in Leipzig and its vicinity (Railway Station to Berlin, Gohlis, Eutritzsch, Rosen-

[1]) According to a symposium in the *Pharmakognostische Rundschau* for the year 1910 (published by Mitlacner, Tunmann and Winckel), Vienna 1911, p. 85.

tal, Schönefeld, Zwenkau, and Miltitz), and have caused a small quantity of it to be collected locally for distilling purposes. From the entire plant, every part of which appears to contain essential oil, we obtained 0.15 per cent. of a dark brown oil, studded with paraffin crystals when at ordinary temperature, possessing an odor which may be said to be intermediate between that of common and of Roman chamomile oil. Sp. gr. at 30° 0.9175, acid v. 18.7, ester v. 77.5. On account of its fairly considerable paraffin-content the oil made no clear solution even with 90 per cent. alcohol. The paraffin which was separated out, after being twice recrystallised from dilute alcohol, melted between 58 and 61°.

Oil of Meriandra benghalensis.—In the course of the present year we received from the Government of the Italian colony of Eritrea two essential oils prepared in that colony, and described as sage oils. The samples were of a pale-brown color and possessed an odor which, although it bore some resemblance to that of sage oil, was nevertheless clearly different. Moreover, the sp. gr. of the two samples was higher than that of sage oil; and they also differed from that oil in being lævorotatory. At our request a sample of the distilling-material had been forwarded with the second oil-sample, and we were therefore in a position to have the raw material botanically examined. Dr. Giessler ascertained that the plant from which the oil was distilled does not belong to the genus *Salvia* at all, but is, in fact, *Meriandra benghalensis,* Benth.; N. O. Labiatæ (recently re-named *M. dianthera,* Briq.), the leaves of which, as a popular remedy, are used for similar purposes as those of sage. Upon distilling the raw material it yielded us 1.5 per cent. of a pale brown oil, with an odor reminding both of sage and rosemary. Further examination produced the following results: $d_{15°}$ 0.9513, α_D — 2° 5′, $n_{D20°}$ 1.47490, acid v. 3.7, ester v. 14.8, soluble in 2 vols. and more of 70 per cent. alcohol. When placed in a freezing mixture the oil solidified to a butter-like consistency as a result of the separation of camphor.

The two oils distilled in Eritrea behaved as follows:

1. $d_{15°}$ 0.9464, α_D—0° 30′, $n_{D20°}$ 1.47176, acid v. 1.0, ester v. 11.8, sol. in 2 vols. a. m. 70% alcohol.
2. $d_{15°}$ 0.9526, α_D—1°, $n_{D20°}$ 1.47548, acid v. 5.6, ester v. 9.3, sol. in 1.8 vols. a. m. 70% alcohol.

Neither sample possessed its full camphor-content, for in the preparation of No. 1 part of the camphor had separated out dur-

ing distillation in the condensing worm, while from No. 2 it had been partly extracted by freezing-out. In both cases, samples of the separated camphor had been sent to us from Eritrea, and the substance was identified more closely from its m. p. (176°), and its oxime (m. p. 118.5°). Optical examination showed it to consist of the dextrorotatory modification.

Santolina Oil.—Santolina Chamæcyparissus, L., N. O. Compositæ, is a native of Southern Europe, and is much cultivated as a garden-plant. It is distinguished by its powerful, penetratingly aromatic odor. Formerly it was official on account of its therapeutic properties, among others as an antispasmodic and anthelmintic, and to this day it is used as a popular remedy throughout its native region. A sample of the herb received from Turin has been worked up by us for essential oil, of which it yielded 0.47 per cent. The oil was of a dark-brown color and in its odor reminded somewhat of wormwood, or rather of tansy. $d_{15°}$ 0.9065; $n_{D20°}$ 1.50040; acid v. 6.6; ester v. 16.4; ester v. after acetyl. 74.2; opt. rot. impossible to determine on account of the dark color. The oil was soluble in 0.5 vols. a. m. 90 per cent. alcohol, with elimination of paraffin; insoluble in 80 per cent. alcohol. So far no further particulars of its composition have been ascertained, but judging from the odor, thujone appears to be one of the constituents.

Santolina oil has also been mentioned recently in a French periodical,[1] but no particulars of its properties are given there, all that is stated being that the oil has an odor reminding of ambrette and closely resembling that of muscatel sage oil. We cannot say the same of the oil distilled by us.

Oil of Satureja cuneifolia.—We are indebted to Dr. Giaconi, of Trieste, for four samples, distilled by himself in Dalmatia, of oil of *Satureja cuneifolia*, Tenore, N. O. Labiatæ. The oils were of a brownish-yellow color and possessed an odor reminding of thyme; their other characteristics were as follows:

	$d_{15°}$	α_D	$n_{D20°}$	Phenols	Soluble in
1.	0.9182	—4° 45′	1.49816	28%	1.2 vol. a. m. 80% alc.
2.	0.9190	—5° 15′	1.49824	34%	1.1 vol. a. m. 80% alc.
3.	0.9444	—2° 15′	1.50528	59%	2.5 vol. a. m. 70% alc.
4.	0.9440	—1° 50′	1.50556	59%	2.7 vol. a. m. 70% alc.

[1]) Parfum. moderne 4 (1911), 97.

Samples Nos. 1 and 2 were insoluble in 10 vols. 70 per cent. alcohol, Nos. 3 and 4 were soluble in about their own vol. of 80 per cent. alcohol. The phenols consisted of carvacrol, the non-phenols had a pronounced odor of cymene, but the samples at our disposal were too small to prove the presence of that body.

OBITUARIES.

American pharmacy has recently lost through death three of her most eminent followers, each being distinguished in a separate department of the work.

Dr. Walter Wyman, Surgeon-General of the United States Public Health and Marine-Hospital Service, was the exponent of the scientific trend in pharmacy and whose valuable work in connection with the revision of the U. S. Pharmacopœia is becoming quite well known to the pharmacists of the United States, died on November 21, 1911. A brief sketch of his exemplary career is given on page 1 of this issue.

Mr. Charles E. Dohme, president of the well known manufacturing house of Sharp and Dohme, died on December 7th at his home in Baltimore. The record of his life is an inspiration to those who are embarking in the profession of pharmacy. He was born in Germany on March 12, 1843; came to the United States at the age of 8; served an apprenticeship in the drug store of Alpheus P. Sharp in Baltimore; graduated from the Maryland College of Pharmacy; entered the employ of the house of Sharp and Dohme; later becoming a member of the firm and finally president of the incorporated house.

Mr. Dohme also found time to devote himself to the advancement of very many other phases of pharmacy. He was president of the Maryland College of Pharmacy, president of the Maryland Pharmaceutical Association and later became president of the American Pharmaceutical Association. He was at one time chairman of the Board of Trustees of the U. S. Pharmacopœial Convention and did much to encourage the publication of the Spanish translation of the U. S. Pharmacopœia. While very active with his business affairs, yet he did not forget to live in the true sense of the word. He was fond of literature and music and in later years travelled extensively. He was interested in the development of the City of Baltimore, and

contributed of his time and means to further its growth. At conventions it was delightful to be with him. He was well posted on nearly all of the subjects of the day as well as those relating to pharmacy. His judgment was excellent, his manner modest and his optimism made for him many friends who revere his memory.

He is survived by his widow and four children—Dr. A. R. L. Dohme, of Sharp & Dohme; Miss Adele Dohme, Mrs. Hans von Marees, of Baltimore, and Mrs. Charles E. Holtzhauer, of Newark, N. J.

Dr. William Muir, one of the most prominent retail pharmacists in the United States, died on November 24, 1911. He was recognized as a leader among the retail pharmacists and was personally known by nearly all of them. Dr. Muir was born in Glasgow, Scotland, in 1850 and came when a mere lad to the United States. He graduated from the College of Pharmacy of the City of New York in 1870. For nearly fifteen years he clerked for some of the most influential pharmacists of Brooklyn. In 1884 he went into business for himself at Bedford Avenue and South Second Street, Brooklyn, and continued here for nearly fifteen years, when he sold his share, retiring with a competence.

Dr. Muir was a charter member of the National Association of Retail Druggists and worked most indefatigably in the interests of the members of that organization. While Dr. Muir was well known for his work in the Kings County Pharmaceutical Society, the New York State Pharmaceutical Association, and the New York State Board of Pharmacy, it is quite likely that his most enduring work was in connection with the N.A.R.D. He was a forceful speaker and ever ready to defend the rights and interests of the retail pharmacists. Dr. Muir was not a theorist and usually labored with those problems in organization work that could be accomplished at the time. Dr. Muir was a member of the Special Committee of the New York State Pharmaceutical Association on the Procter Monument Fund, and it was largely through his efforts that over $200 was collected (see Proc. A. Ph. A., 1907, p. 98).

Dr. Muir was prepossessing in appearance and being of a generous and cordial disposition made many friends in the organizations of which he was a member.